

- (b) subsequently drying the silk or silk cocoons after treatment of the silk or silk cocoons with the ionic reagent; and
- (c) subsequently dissolving the silk or silk cocoons in a chaotropic agent.

39. The method according to claim **38**, wherein the step of dissolving the silk or silk cocoons is performed under any one of the following conditions, or any combination of the following conditions:

- at a temperature of less than 60° C.;
- with a concentration of chaotropic agent less than 9M; and
- for a period of time of less than 24 hours.

40. The method according to claim **38**, wherein the method comprises a further step of degumming the silk or silk cocoons.

41. The method according to claim **38**, wherein substantially all of the water is removed from the treated silk or silk cocoons.

42. The method according to claim **40**, wherein the degummed silk or silk cocoons are dissolved in the chaotropic agent within a temperature range of approximately 10° C. to approximately 60° C.

43. The method according to claim **38**, wherein suitable chaotropic agents include lithium bromide, lithium thiocyanate, or guanidinium thiocyanate.

44. The method according to claim **40**, wherein degumming the silk or silk cocoons comprises the selective removal of sericin from the silk or silk cocoons and using a proteolytic enzyme which cleaves sericin, but produces little or no cleavage of fibroin.

45. The method according to claim **38**, wherein the chaotropic agent is removed by dialysis to provide a regenerated silk fibroin solution.

46. The method according to claim **45**, wherein the method comprises the step of concentrating the regenerated silk fibroin solution to a concentration of approximately 5-25% w/v.

47. A regenerated silk fibroin solution obtainable by any of the methods according to claim **38**.

48. A method of preparing a fibroin material comprising gelling the regenerated silk fibroin solution according to claim **47**.

49. The method according to claim **48**, wherein the regenerated silk fibroin solution is gelled by treating the fibroin solution with an aqueous solution of a gelling reagent or by a combination of gelling reagents, such as, for example, an acid.

50. The method according to claim **48**, wherein the regenerated silk fibroin solution is gelled to form a hydrogel.

51. The method according to claim **48**, wherein the gelled material is subjected to one or more freezing cycles.

52. A fibroin material obtainable by the method according to claim **48**.

53. An implantable fibroin material, the material comprising the following properties:

- an unconfined compressive tangent modulus of between 0.3-5 MPa at 5% strain;
- an ultimate compressive strength (stress to yield point) of 1-20 MPa;
- an average cumulative non-recoverable deformation of less than 10% after 3 million cycles to a nominal strain of 5% in phosphate buffered saline; and
- a Dynamic Modulus of at least 1.5 MPa after at least 3 million cycles to a nominal strain of 5% in phosphate buffered saline.

54. An implantable porous fibroin material, the material comprising the following properties:

- an average cumulative non-recoverable deformation of less than 10% after 3 million cycles to a nominal strain of 5% in phosphate buffered saline; and
- pores covering from approximately 10% up to approximately 80% of a cross-section of the material.

55. The material according to claim **53**, wherein the material comprises intercommunicating pores.

56. The material according to claim **55**, wherein the pores cover from approximately 10% up to approximately 80% of a cross-section of the material.

57. An implant for the replacement, partial replacement, augmentation or repair of articular cartilage or fibrocartilage comprising the fibroin material prepared from the fibroin solution according to claim **47**.

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